AMPLIFYING CIVIC INNOVATION

Community Engagement Strategies for Open Data Collaborations

By Jennifer Angarita

A joint report by the City of Cambridge and Ash Center for Governance and Innovation

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Definitions

CIVIC TECHNOLOGISTS: Individuals or groups that use technology for civic impact.

COMMUNITY ENGAGEMENT: The process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the well-being of those people.

DATA COLLABORATIVE: Groups that pool data from different organizations and sectors.

DATA LITERACY: The desire and ability to engage constructively in society through and with data.

NGO: Non-governmental organization.

OPEN DATA: Data that is easily accessible, machine-readable, accessible for free or at negligible cost, and with minimal limitations on its use, transformation, and distribution.

TECHNOLOGY LITERACY: The ability to use appropriate technology to communicate, solve problems, acquire knowledge and skills, and manage evaluate, design and create information.

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I.   Executive Summary

Today, cities around the world are eager to harness open data to improve not only government transparency and accountability, but also citizen engagement. Much of the value of open data comes from its collaborative and innovative use by city staff, residents, civic technologists, researchers, advocates and others. By improving stakeholder engagement with open data users, cities are better suited to unlock the potential of open data through new analyses and civic innovations. However, an enduring problem facing governments is the lack of inclusive, productive and sustained collaborations with different users of open data.

Since 2015, the City of Cambridge has made its data open and accessible to the public, taking part in numerous open data collaborations with city partners. This analysis aimed to examine how the City can improve collaboration with external users of the City's open data to increase the impact of civic innovation for local residents. The goal of this report is to inform the City's open data collaborations, to identify best practices in public engagement and civic innovation, and to generate concrete recommendations for governments seeking to increase inclusive engagement around open government data.

Through an assessment of the relevant academic literature, in-depth interviews with dozens of stakeholders and an evaluation of an online survey, this report generated numerous findings including, but not limited to:

1. **Successful open data projects are problem-oriented**, often focusing on addressing specific, defined problems or needs.

2. **City staff's varying levels of operational capacity** and technology literacy can at times be a barrier to initiating and sustaining open data projects.

3. **Stakeholders have a range of preferences** for different engagement and communications tools at different stages of collaboration.

4. **Adoption challenges are rarely assessed** or communicated early on.

5. **Holistic open data evaluations examine both in-person and digital engagement,** focusing on activities, quality and impact.

Informed by the findings above, the following next steps are suggested to increase the long-term success and sustainability of open data collaborations. Specific next steps include:

1. **DEFINE THE PROBLEM: Subject matter experts in cities should help frame essential questions and craft well-defined problem statements and use cases for open data.** Working alongside impacted communities, subject matter experts in cities often have significant in-depth knowledge about local civic issues. As a result, they are well suited to help formulate and clarify civic problem statements that address the real needs of residents.

2. **COMMUNICATE: Cities should leverage existing communications tools (e.g. press releases), while iterating with new communications practices (e.g. online forums).** Because different audiences value and use different engagement tools, communications practices should be flexible and iterative, taking place offline and online, informally and formally. Cities should consider which engagement tools are most apt to use at different stages of open data collaborations.

3. **BUILD CAPCACITY: Cities should showcase open data successes and identify open data champions.** Highlighting success cases can help internal and external stakeholders increase investment in open data collaborations Moreover, appointing multiple open data champions can signal the value of open data both internally and externally.

4. **IMPLEMENT: Communicate adoption constraints and expectations to external partners early on, while designing for usability and sustainability.** Adoption challenges are often overlooked in the early stages of open data collaborations and are increasingly difficult to overcome in later stages.

5. **EVALUATE: Consider a diverse range of criteria for both in-person and digital engagement.** Focusing on activities, quality and impact as opposed to one-sided metrics like "number of downloads" can help capture a more nuanced assessment of open data projects.

Taken together, these findings and recommendations can help inform future open data collaborations and positively impact users and residents. These recommendations are grounded in the understanding that a diverse array of stakeholders must be engaged to support the best use of open data. Using these next steps as a starting point, governments can move beyond developing solutions in isolation to developing or co-producing civic solutions in collaboration with community partners.

II.   Introduction

Across the US, city governments are making data open and accessible to the public. In 2015, the City of Cambridge passed an ordinance formalizing its open data program to build on its commitment to transparency, efficiency, and innovation. By providing city data to the community, Cambridge empowers residents, volunteer programmers and others to explore data, generate analysis and build new innovations that can benefit the municipality and its residents. The City's Open Data initiative has four key goals to **(1)** increase transparency, **(2)** improve the delivery of city services, **(3)** realize the social and commercial value of open data, and **(4)** provide greater access for the public to work collaboratively on challenges facing the City.[1]

This report explores how the City of Cambridge's open data program can improve collaboration with external stakeholders using the City's open data to increase the impact of civic innovation and ultimately help improve the lives of Cambridge residents. The purpose of this analysis is to inform the City's current and future collaborations, to identify best practices in public engagement and civic innovation, and to generate a series of useful recommendations for the City. The findings in this report may also be useful for other governments seeking to increase engagement and collaboration around open government data.

A.   Problem analysis

Achieving the City's goals for its open data program necessitates meaningful engagement with external stakeholders. In practice, cities often struggle to inclusively and systematically engage with city residents and organizational partners.[2] An enduring problem is the lack of a productive, inclusive and sustained communication and collaboration among city staff, residents and users of open data, such as civic technologists.

Three key elements affect this problem:
1.   Stakeholders often lack the time, technical literacy and operational capacity to identify highly valuable open data projects and deeply engage in open data initiatives.
2.   Volunteer civic projects have wide variability in project staffing and completion.
3.   City staff and external partners are limited in their understanding of each other's operational frameworks, constraints, and tools.

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[1] City of Cambridge "Open Data Ordinance" 2015.
I.   [2] Living Cities Blog "Using Civic Tech to Increase the Engagement of Low-Income Communities." February 2013
https://www.livingcities.org/blog/212-using-civic-tech-to-increase-the-engagement-of-low-income-communities

From the perspective of city staff, the most frequently cited barriers to collaboration include the lack of time, resources, operational capacity and limited technological capacity to effectively engage in open data projects. City staff also pointed to the difficulty in understanding or forecasting the scope and timeline of collaborations with civic technologists, largely due to the unpredictability of project staffing and completion. Moreover, city staff may be unaware of the full menu of technological solutions for city problems or the full range of use cases for Cambridge's open data.

Likewise, civic technologists or data collaboratives often find it difficult to identify the City's true needs and to predict whether a potential civic technology project will be a valuable and worthwhile endeavor. There are several explanations for this inefficiency. First, technology groups are often not representative of the demographics of city residents[3]. Second, they may lack in-depth knowledge about the issues that they are trying to solve. For example, civic technologists may be tasked with developing a civic technology solution for a specific local policy issue in which they have limited expertise, such as housing or transportation. Finally, they may not fully understand the operational constraints of city governments, such as the operating systems used by city IT departments or the intellectual property due diligence procedures used by city solicitors. One civic technologist stressed the need for an "open data sherpa or guide person" to communicate, translate and liaise across between city employees and civic technologists.

Given the challenges facing governments, a new model of collaboration is needed—one in which city staff, the civic innovation community, and everyday residents work together to identify new, inclusive and innovative uses for the City's data.

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[3]Code for America "How We're Working to Diversify Brigade Leadership"
"https://www.codeforamerica.org/blog/2015/06/17/how-were-working-to-diversify-brigade-leadership/ June 2015

B.   Research Study Overview

Aim of this report: The City of Cambridge understands that open data is a valuable resource and an important starting point for innovation. This research project aims to improve the City's collaboration and communication with external stakeholders to increase the impact of the open data program.

The central research question for this research project is: How can the City of Cambridge's open data program improve collaboration with external stakeholders using the City's open data to increase the impact of civic innovation for Cambridge residents?

This report also seeks to address the following sub-questions:

1. Are the right set of external stakeholders being engaged?
2. Are open data collaborations inclusive?
3. Are open data collaborations addressing city needs?
4. Are civic technologists able to access and use the datasets needed?
5. Is the City able to adopt solutions?
6. What metrics or indicators can the City use to track progress on collaboration?

C.   Structure of the Report

This report is organized in the following way:

- **Open Data Background** provides a broad overview of the literature related to open data and community engagement. In addition, it discusses some of the emerging challenges and opportunities cities face in promoting open data collaborations.

- **Key Themes and Findings** aim to identify best practices and insights into successful open data collaborations as well as patterns related to the needs and goals of the users of the City of Cambridge's open data program. The findings were generated from an online survey conducted from June 16th to July 18th, 2016, as well as numerous in-depth interviews and focus groups.

- **Recommendations** suggest next steps for how the City of Cambridge can improve the design, implementation and evaluation of open data collaborations.

- **Appendices** include a stakeholder analysis, a logic model of open data collaborations, and related resources at MIT and Harvard.

D.   Methodology

In order to answer the central research question, I reviewed relevant academic literature that addressed both community and civic engagement strategies related to open data. In addition, I collected and analyzed both quantitative and qualitative data from a range of stakeholders.

To generate qualitative data, I conducted in-depth interviews and focus groups with nearly 40 stakeholders including city residents, researchers, university staff, civic technologists, members of community-based organizations, open data program staff and city employees in Cambridge and several other US cities. I analyzed dozens of "open data projects" in both Cambridge and key cities across the US. The interviews were transcribed, coded and analyzed for commonalities.

Additionally, these research interviews were supplemented by an online survey to understand how residents work with open data, what challenges they face, and how the City might optimize its open data program for civic innovation. Ultimately, a combination of primary and secondary research culminated in a series of findings and recommendations for the City of Cambridge.

E.   Open Data Challenges and Opportunities

The following two sections provide a brief overview of the literature related to open data and community engagement. It will be followed by a deeper discussion of specific open data and public engagement strategies, guidelines and best practices in **Section III.**

Open government data can serve as a significant resource, offering wide-ranging—though often untapped—benefits to the public. The value of open data includes economic benefits, such as the creation of new services, systems and industries; improved transparency and accountability through increased visibility on government spending, projects and effectiveness; and improved policy and programs. [4] Open data also presents an opportunity to

"Data by itself is useless. Data is only useful if you apply it."

- Todd Park, former United States Chief Technology Officer

improve relations between the government and citizens through increased collaboration. In particular, high quality, routinely updated data is better suited to add value than lower-quality, rarely updated data. For an assessment of the potential short- and long-term outcomes of open data collaborations, please see **Appendix I.**

One central challenge in leveraging open data to make a civic impact is the lack of technical and operational capacity or resources. This could be influenced by a number of factors such as low technical literacy of both community residents and municipal staff.[5] Cultural obstacles include the risk-averse preference of governments, which may be less able than private sector firms to test out new data and technology projects. [6] Other challenges include privacy and security concerns as well as limited resource allocations.

Publishing open data represents a growing trend in municipalities across the US. As the open data field continues to evolve, understanding the emerging and ongoing challenges and opportunities is essential for the success of open data projects.

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[4] Bill Schrier "Government Open Data: Benefits, Strategies and Use" https://depts.washington.edu/esreview/wordpress/wp-content/uploads/2014/07/2014-Government-Open-Data.pdf
[5] Ibid.
[6] Omidyar network http://odimpact.org/static/files/open-data-impact-key-findings.pdf

F.   Open Data and Community Engagement

From San Francisco to Cambridge, governments are publishing data online that is freely available, accessible, and can be used by citizens, businesses, nonprofits and programmers alike. At the same time, municipalities are striving to improve the timeliness, transparency and accessibility of their datasets. [7]

Recent literature on open data has suggested three stages of open government: 1) improved transparency and accountability, 2) improved open dialogue with residents and finally, (3) improved collaborations with society to solve civic problems.[8] While many governments have focused on the transparency of open data, few governments have developed or implemented comprehensive and inclusive engagement strategies for systematically collaborating with and supporting external users of open data over the long-term. More recently, open data practitioners have begun emphasizing the development of civic solutions *with* residents as opposed to *for* residents. [9] Still, many governments lack clear next steps on how to implement inclusive engagement strategies. One participant of this research study noted, "Open data and community engagement are like two ships passing in the night," rarely operating in tandem with each other.

Overall, the academic research on the best strategies for engaging external stakeholders who use open data is evolving, with many governments and other stakeholders seeking additional guidance. [10] The wealth of literature on community engagement has only recently begun to address the growing trend of open data, and open data research is overall limited in its discussion of community engagement. This report aims to fill in this gap and will focus on several groups that may benefit from the publication and use of open data, including: local residents, civic technologists, academic researchers, NGOs and neighborhood associations.

Community engagement refers to "the process of working collaboratively with groups of people affiliated by geography, special interest, or background to address issues affecting the well-being of those people."[11] It is often understood as an indicator of a robust democracy and an important driver of social capital.[12] Community engagement can be viewed as a spectrum with increasing levels of community involvement, trust, and communication from passive outreach (e.g. informing the public about city initiatives) to shared leadership (e.g. partnering with the public to develop solutions). Community engagement strategies for open data can fall along the spectrum of impact and should be aligned with the goals and intention of an open data program.

Table 1 below offers an example of how open data can fall along the spectrum of public impact and participation.

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[7] Updating data in a timely manner is an important step for improving the quality of data and increasing the chance of success of open data projects.
[8] Joeri van den Steenhoven "Open government: Three stages for co-developing solutions" https://www.marsdd.com/news-and-insights/open-government-three-stages-for-codeveloping-solutions/

[9] Gov Ex "Thinking More Broadly About Community Engagement in Open Data and Performance Analytics" http://govex.jhu.edu/thinking-more-broadly-about-community-engagement-in-open-data-and-performance-analytics/
[10] Ibid.
[11] Principles of Community Engagement https://www.atsdr.cdc.gov/communityengagement/pdf/PCE_Report_508_FINAL.pdf
[12] Thomas Christiano "The Rule of the Many: Fundamental Issues in Democratic Theory" (1996)

Table 1. Spectrum of Public Participation[13]

INCREASING LEVEL OF PUBLIC IMPACT			

Inform	Consult	Involve	Collaborate
Community Engagement Goal:			
To inform the public and help them understand open data needs and solutions.	To obtain public feedback on analysis, alternatives or decisions related to open data.	To work directly with the public to ensure public concerns and aspirations related to open data are addressed	To partner with the public in decision-making, including developing solutions and alternatives.
Promise to the Public:			
We will keep you informed about open data.	We will keep you informed, listen to and acknowledge concerns about open data.	We will work with you to ensure your requests, needs and aspirations are reflected in the open data programs.	We will look to you for direct advice and recommendations in formulating open data solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.
Example Tools:			
• Fact sheets • Websites • Open houses	• Focus groups • Surveys • Public meetings • Public comment	• Workshops • Online forums	• Citizen advisory committees • Consensus-building • Participatory decision-making

According to a report by the Omidyar network on open data, partnerships—particularly those with civil society groups and civic technologists—are a key factor in the success of civic technology projects.[14] Although historically most open data efforts have focused on the role of technology in sustaining civic technology projects, some open data practitioners have begun highlighting open data strategies that emphasize community over technology. Overall, developing collaborative, sustainable and inclusive public engagement strategies for open data is an important factor to increase the impact of civic innovations.

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[13] Adapted from IAPP Public Participation Spectrum
[14] Omidyar network http://odimpact.org/static/files/open-data-impact-key-findings.pdf p17

III. Key Themes and Findings:
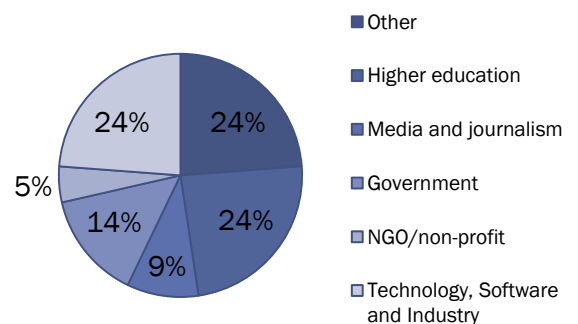
A.   Open Data Usage and Experience

Understanding the needs and motivations of city residents and organizational partners is a critical step to developing user-centered civic innovations that address community needs. Moreover, having a strong grasp of the demographics and background of open data users can help municipalities tailor their engagement strategies. Laurenellen McCann explains, "If your work is with communities, you better be able to literally define that community. Drill down and outline the individuals, groups, neighborhoods, key players, non-profits, businesses, you name it that make up the 'community' you work with or are trying to work with. Once you've identified that 'who', literally go meet them where they are. (Physically, digitally, otherwise: Find out and show up.)" [15]

The follow findings offer insights into the background, needs and goals of the users of the City of Cambridge's open data program. These findings were generated from an online survey conducted from June *16th* to July 18th, 2016. The survey had 70 participants, about half of whom completed the survey in full.

Open Data User Segments: (as of July 18th, 2016):[16]
  - ➢ **City Residency:** 77% of survey respondents were City of Cambridge residents.

  - ➢ **Industry of Open Data Users:** Of the participants who had visited the open data portal, approximately one quarter worked in the technology and software industry and one quarter worked or studied in higher education institutions. Other industries represented include the NGO sector and government. Retirees comprised the majority of the "other" responses.

Figure 1. Industry of Open Data Users

- Other
- Higher education
- Media and journalism
- Government
- NGO/non-profit
- Technology, Software and Industry

  - ➢ **Community Involvement:** 45% of respondents were volunteers, members or staff of community-based organizations. These include neighborhood alliances and nonprofits such as Fresh Pond Residents Alliance, Education Pioneers, Transit Matters, Muck Rock, Boston Cyclists' Union, YWCA, and Justice at Work. Many respondents were members of more than one community-based organization. Although the role of NGOs in engaging in open data has not been fully studied, **this finding suggests the need for increased attention to nonprofits and community-based organizations that city residents are members of.**

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[15] Laurenellen McCann https://medium.com/@elle_mccann/no-more-trickle-down-civictech-81341cf48a14#.uvy73f8hb
[16] City of Cambridge "Open Data Survey." July 2016

➢ **Civic technology:** Over 70% of survey respondents were not a member of a civic technology or coding group. Therefore, engaging exclusively with civic technology groups has the potential to exclude a large proportion of open data users. **This suggests that public engagement efforts should both include and expand beyond members of civic technology or coding groups.**

Frequency of Use:

➢ **Open Data Usage:** The survey indicates a stark contrast between frequent and infrequent users. About one in five users visited weekly while over one third visited once per year. About half of survey respondents visited the open data portal one to three times per year, while the other half visited four or more times a year. **This indicates a wide range of utilization of Cambridge's open data and suggests a need for more research to better understand and target the different needs of different users.**

➢ **Civic Technology Affiliation:** Participation in a civic technology group is associated with a higher usage of open data. Those affiliated with a civic technology group (such as Code for Boston) visited the open data portal more frequently, on average every two to three months. Members of a civic technology groups also reported a higher familiarity with open data, suggesting that individuals not affiliated with a civic technology group might need more education and training around open data.

Needs:

➢ Two-thirds of survey respondents expressed interest in an open data online forum or wiki page to increase communication with city staff. **This finding indicates a growing appetite for online forms of engagement between external partners and city staff and suggests a practical tool for fostering collaborations.**

➢ The most requested datasets are (1) housing data, (2) transportation data and (3) geographical data.[17]

➢ Survey participants affiliated with a civic technology groups reported using open data to build and integrate applications, while those unaffiliated with civic tech groups reported using open data to explore and analyze city data. **The survey indicates a wide range of motivations for using open data, which suggests different kinds of engagement strategies may be necessary to collaborate with different kinds of open data users, depending on their needs and aspirations.**

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[17] It is worth noting housing and transportation are topics, but geographical data can be both a topic area and a data format.

➤ The survey indicated that open data users could find the datasets they need, but the

Figure 2. Open Data Usage
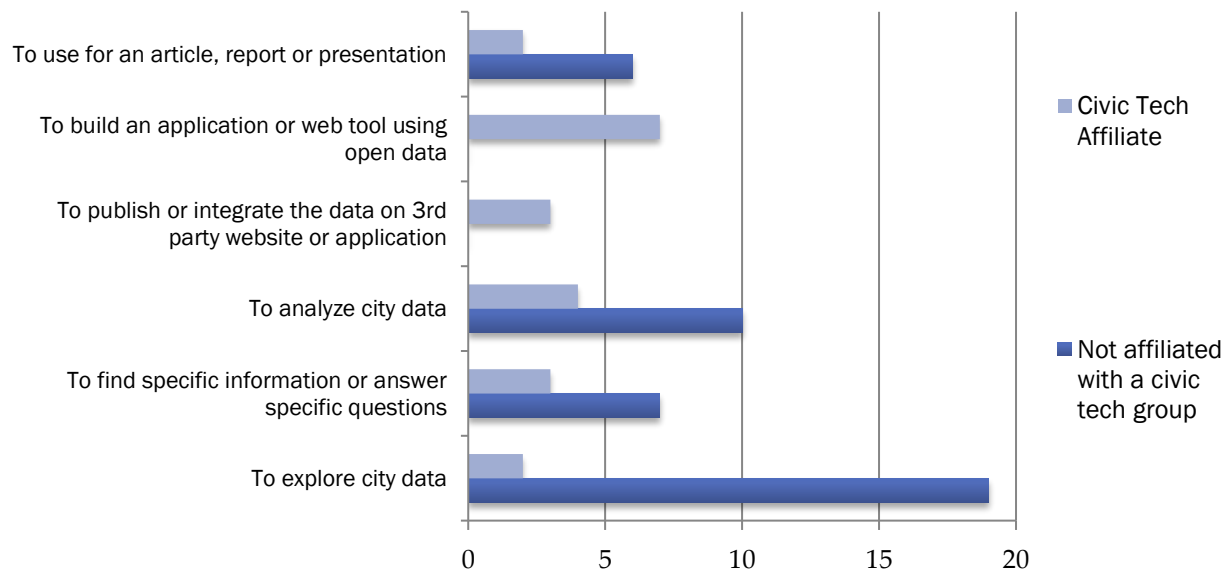
search process can be time-consuming and/or cumbersome.

- o In the survey, respondents cited satisfaction with their ability to locate the datasets needed. 87% of survey respondents said they were able to find the City's datasets when they needed them.
- o However, interview participants discussed the challenge of navigating the open portal as it is currently laid out. One participant described difficulty in understanding the taxonomy of the site and being unable to find datasets without using the search feature.
- o Additionally, while most users anecdotally might be able to find the majority of datasets they are looking for, several users expressed interest in being systematically notified of new datasets. For instance, one user requested a dataset that was already available on the open data portal for several months, suggesting the need for improved communications and marketing to highlight new datasets.

B.   Key Findings

The following are a series of themes and findings generated by interviews with stakeholders and survey analysis:

Problem Scoping

Finding #1 Successful open data projects are problem-oriented, focusing on addressing a specific, defined problem or need.

A report by the Omidyar network found that successful open data projects often have a "well-defined problem" outlined from the onset.[18] Projects should aim to identify a pre-existing, recognizable problem or need and "provide new solutions or efficiencies to address that need."[19] According to several interview participants, the most successful projects took place when city experts identified a problem upfront and communicated the problem succinctly to external partners, including civic technologists. Additionally, successful problem scoping requires a degree of specificity in identifying and defining problems.

At the same time, the public sector's technological understanding of the value of different data can be limited. On occasion, adding new datasets can illuminate a problem to be solved that would otherwise go unnoticed. For example, the release of NYC parking ticket data led to innovations and new information that allowed several city departments to operate more effectively.[20] Sometimes, problem discovery follows data release, so while interview participants suggest governments spend most of their time focusing on the demand side, it is important to maintain some flexibility for problem discovery. Interviewees highlighted the importance of understanding which datasets are in high demand and relevant for citizen engagement.

> "We also found the more specific you can be, the better... Now I'm very specific and try to set out expectations as best as possible. "
>
> - Interview Participant July 2016

NEXT STEP: Focus on identifying and clarifying city problems, but maintain flexibility upload a dataset out there even if you don't see an immediate use case.

Diversity

[18] Omidyar network http://odimpact.org/static/files/open-data-impact-key-findings.pdf
[19] Omidyar Report
[20] Inverse "How New York City's Open Data Revealed the NYPD Was Issuing Illegal Parking Tickets" May 2016
https://www.inverse.com/article/15564-how-new-york-city-s-open-data-revealed-the-nypd-was-issuing-illegal-parking-tickets

Finding #2 Civic technology groups are not fully representative of city residents.

To be inclusive of the diverse range of perspectives and needs of city partners, open data collaborations should seek to engage multiple stakeholder communities. As previously cited, civic technology groups represent only a fraction of open data users. In representing a small subsection of city residents, civic technology groups are often not reflective of the city's broader gender, racial and socioeconomic diversity.

Cities should strive to be inclusive and understand the equity and diversity limitations in the civic technology field. One interview participant explains that the civic technology field has "too much focus from the tech community on issues that only matter to us and not enough on issues that affect everyone and that we have the power to address." In practice, civic innovations might not be digitally inclusive and might fail to fully meet the needs of diverse communities. For instance, civic technology solutions might have technological, language or cost barriers that render it inaccessible to everyday city residents.

> "Digitally inclusive practices mean being aware of technological realties of user populations, being aware of their capacity to download certain kinds of content [and] meeting accessibility requirements. [It means] making sure metadata is there so accessibility tools work properly. "
>
> - Interview Participant
> July 2016

Several interview participants noted that cities should still engage with civic technology groups, but alongside other community groups. Overall, cities should place special attention in partnering with diverse communities that are demographically representative of the city's overall population. This could include diverse civic technology groups as well as local NGOs or neighborhood associations. Additionally, cities should focus on scoping out problems or projects that truly address the concerns of city residents and ensuring that barriers to technology access are kept low.

NEXT STEP: Conduct outreach to diverse civic technology groups such as Resilient Coders and Women Who Code.

Finding #3 Cities need open data champions at different levels.

The need for open data champions is a sentiment widely shared by open data users in the Greater Boston Area as well as those in other cities across the US. Data champions can serve a critical role in the success of open data projects, but cities need different kinds of data champions serving at different levels of city government.

Having an executive-level open data champion can help set the agenda for a city around open data and encourage various city stakeholders to get on board. Additionally, within city departments, "technological evangelists" can play a role in locating and streaming data from city staff and identifying city needs that could be addressed through open data. Across city departments, other data champions can help train users on open data usage internally. Each of these roles is instrumental to helping promote and initiate open data projects. Identifying open data champions and equipping them with the necessary tools to succeed is important step in elevating the importance of open data citywide.

Table 2. Potential Data Champion Roles

|	
Executive Data Champion **NEXT STEP: Identify 3 key open data champions for the City of Cambridge.**	• Set the agenda and priorities for open data city-wide and highlight successful open data projects
Inter-departmental Data Champion	• Locate and integrate open datasets • Identify use cases for open data
Intra-departmental Data Champion	• Train citywide staff on open data uses and strategies • Connect city employees to external partners

Finding #4 Successful open data projects are able to identify and leverage the local needs and unique strengths of cities.

Local Needs: Effective open data projects frequently leverage location and locality as a common factor. According to one interview participant, "Open data communities are often home-grown and reflect the local dynamics of the cities they are in." Many interview participants stressed the importance of focusing on what the specific, day-to-day needs and interests of local users are. In the City of Cambridge, the top three requested kinds of data are housing data, transportation data and geographical data, suggesting that open data users are particularly interested in data sets of local value and relevancy. In addition, the City of Cambridge's 2016 survey found that of open data users who had worked on an open data project, 88% had used open data for local issues compared with 12% for national issues.

Figure 3. Requested Data Sources
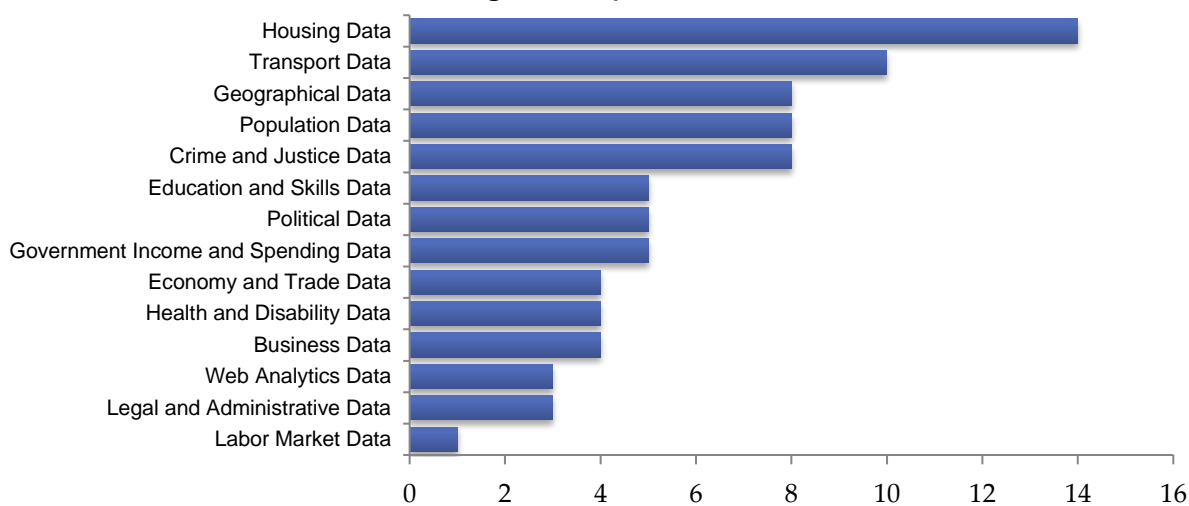
Unique Strengths: Moreover, open data projects should capitalize on the strengths of a city, such as flourishing local industries, well-organized community based organizations, and resourceful research partners. In Kansas City, Missouri, the open data program tapped into the talents and creativity of a thriving local artist community to transform ten of the city's datasets into compelling artwork.[21] Through an Art of Data exhibit, the project successfully showcased the city's data and leveraged a unique and strategic city asset. In Cambridge, tapping into the resources of MIT and Harvard through student projects and partnerships with research labs offers an opportunity to encourage the use of open data and leverage the unique strengths of the city. For a list of relevant faculty, student groups and resources at MIT and Harvard see Appendix III.

NEXT STEP: Create partnerships with MIT and Harvard for future open data projects.

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[21] City of Kansas City "The Art of Data." http://kcmo.gov/citymanagersoffice/creative-services/art-of-data/ June 2015

Finding #5 City staff has varying levels of operational capacity and technology literacy, can at times be a barrier to initiating and investing in open data projects.

Across cities in the US, the need for improved capacity around open data is increasingly apparent. Limited operational capacity and resource allocation can hamper the success of open data collaborations. According to one interviewee, "the projects that were most successful were the ones where people had time, resources and expertise to carry a big load. After you make a certain amount of progress you can bring attention and bring in more people to the process." Interviews with city employee revealed that subject matter experts in cities often had varying levels of operational capacity to devote to open data collaborations. However, even when staff had the interest, desire and flexibility to engage in open data projects, city staff often perceived that they lacked the data and technology literacy to fully engage with open data.

Improving the data and technology literacy of city staff has two key benefits. First, improved data and technology literacy increases the willingness and desire of city staff to begin engaging in open data projects. Secondly, improved data and technology literacy expands the number of possible solutions by improving the ability of staff to develop creative and well-defined problem definitions. For instance, a better understanding of relevant technology can help city staff come up with sophisticated use cases and identify interesting open data project.

> **Data literacy** refers to "the desire and ability to engage constructively in society through and with data."
>
> **Technology literacy** refers to the ability to use technology to effectively communicate, solve problems, acquire knowledge and manage information.

As part of improving technology literacy, open data users and proponents should understand both the analysis and application of open data. Data analysis is the process of using data to generate useful information, produce relevant conclusions and support decision-making.[24] Data analysis and application present unique opportunities to leverage open data but are not mutually exclusive. For instance, static analyses can be proofs of concept that can later be turned into applications. An application can be understood as a templated, easily reproducible analysis. Internal and external users of open data should understand the different uses and advantages of data analysis and application.

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[22] Data Pop Alliance "Beyond Data Literacy: Reinventing Community Engagement and Empowerment in the Age of Data" https://datatherapy.files.wordpress.com/2015/10/beyond-data-literacy-2015.pdf September 2015
[23] Technology Literacy Assessment Project "What is Technology Literacy?" http://www.coloradotechliteracy.org/org/documentation/pdfs/module1pdfs/TLAPMod-1.pdf May 2009
[24] Boundless. "Analyzing Data and Drawing Conclusions." *Boundless Sociology*. Boundless, 26 May. 2016. Retrieved 01 Aug. 2016 from https://www.boundless.com/sociology/textbooks/boundless-sociology-textbook/sociological-research-2/the-research-process-26/analyzing-data-and-drawing-conclusions-170-7474/

According to a 2015 white paper on data literacy by the Data Pop Alliance:

> Supporting data literacy is not primarily about enabling individuals to master a particular skill or to become proficient in a certain technology platform. Rather it is about equipping individuals to understand the underlying principles and challenges of data. This understanding will in turn empower people to comprehend, interpret, and use the data they encounter—and even to produce and analyze their own data. This can only be achieved by considering data literacy becomes a means toward a necessary reinvention of community engagement and empowerment.[25]

Overall, improved data and technology literacy has many advantages and can enable city staff and others to increase their usage of open data and improve collaborations with civic technologists. Technology trainings and workshops can help city staff improve its understanding and familiarity of open data but unless staff has the time and capacity to invest in open data projects, additional trainings may overburden city employees. Improved technological literacy therefore must be paired alongside increased operational capacity and multi-level championship of data literacy.

NEXT STEP: Host brownbag training for city staff to improve technological literacy.

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[25] Data Pop Alliance "Beyond Data Literacy: Reinventing Community Engagement and Empowerment in the Age of Data" https://datatherapy.files.wordpress.com/2015/10/beyond-data-literacy-2015.pdf September 2015

Finding #6 To use open data, both internal city users and external partners need to explicitly see the value of open data.

Internal Open Data Users:

Showcasing the value of open data to city staff and management is a key step in building a culture that supports open data projects. One city staff member explains, "If you're going to have somebody do something with open data, you need to show them you can put in a dollar and get back five." Moreover, when city employees see the value in open data projects, they are more likely to experiment and test out new applications or analysis using open data.

One way municipalities can more readily demonstrate the value of open data of city staff is through internal data sharing and analysis. For instance, cities could encourage staff to identify potential areas for analysis that may offers new insights and address residents' needs. One interview participant explains "Say the Department of Neighborhood Development [has a] dataset on homelessness, which is also really sensitive because Emergency Management needs that data. [The Emergency Management Department] needs to know how many people to evacuate during emergencies and what neighborhoods to target. What open data can do is create connections between departments and around problems. We have a lot of departments that need important datasets from each other."

Internal data sharing and analyses can serve as an important starting point for better leveraging open data. Cites can identify appropriate pathways to facilitate internal data analysis, which in turn highlights useful analysis that can be used for civic innovations.

External Open Data Users:

Similarly, external partners who have less open data experience, such as NGOs and some researchers, need to understand the potential of open data in order to be motivated to use it. Identifying open data users and understanding their perspectives and motivations is a key first step to initiating a successful community engagement strategy. To identify key external partners, cities should consider conducting a stakeholder analysis, mapping who the stakeholders are, how they will contribute, how they will benefit from open data and what their constraints are. An example stakeholder analysis can be found in Appendix I. When reaching out to stakeholders, cities should emphasize that open data and civic technology can be powerful tools for helping community groups achieve their goals."

Across cities and regions, participants of this study frequently highlighted the importance of emphasizing and re-emphasizing success. To be emulated, success needs to be documented and widely shared. Highlighting open data successes can inspire new partnerships, educate stakeholders about the possibilities of civic innovation and help make the case for increased operational capacity.

NEXT STEP: Develop an online showcase highlighting successful open data projects and a dataset of the month.

Finding #7 One Size does not fit all: Stakeholders have a wide range of preferences for different forms of engagement at different stages of collaboration.

Figure 4. Stages of Open Data Collaborations
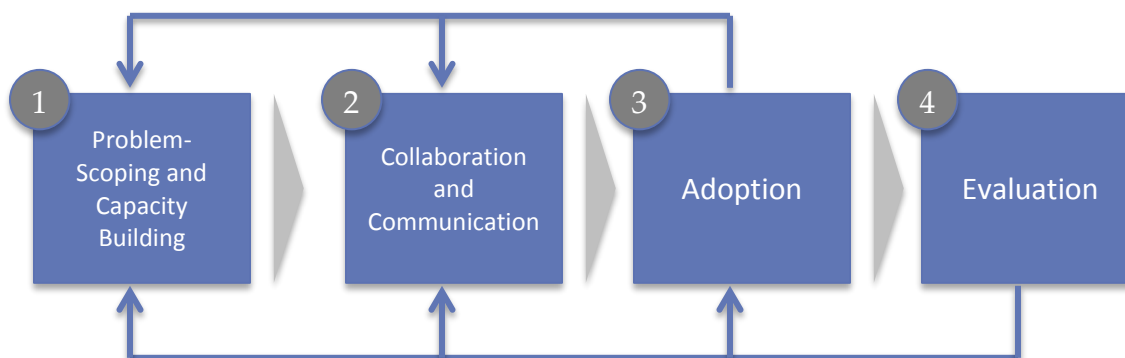
From ideating a civic solution to developing and adopting an innovation, the stages of open data collaboration are often less linear and clear cut than they may appear. Cities should understand the opportunities and constraints of different stages of collaboration. For instance, while a Hack-a-thon or Scope-a-thon might be a useful collaboration tool for the initial stage of problem scoping, it might prove less useful during the adoption and evaluation stage. In particular, questions around evaluation and implementation of civic innovation need to be considered during the ideation and creation phases.

Moreover, different stakeholders value different modes of communication and engagement tools. Regardless of the kind of engagement tool or strategy used, technology should strive to "connect different communities, develop relationships, spur discovery, reveal common needs and enhance the ability to act."[26]

Technology tools can be useful in facilitating different modes of communication, but no technology tool can fully meet the needs of all stakeholders. Thus, a collaboration strategy should strive to have both offline and online components. [27] For instance, in addition to more traditional methods of public engagement, such as in-person community meetings, emerging online engagement tools could be used.[28]

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[26]Knight Foundation "Digital Citizenship Tech Engagement Summit Report"
http://www.knightfoundation.org/media/uploads/media_pdfs/Digital-Citizenship-tech4engage-summit-report.pdf page 8
[27]Ibid.

Based on survey data from June to July 2016, open data users demonstrated a preference for a number of different engagement tools including (1) Crowdsourced Problem Inventory (2) Scope-a-thon (3) Citizen guidebook on using open data and, (4) Online Open data Showcase. Most notably, users were least interested in Hack-a-thons, possibly because they are already frequently used and/or there is a growing desire for new forms of engagement.

Figure 5. Preferred Engagement Tools
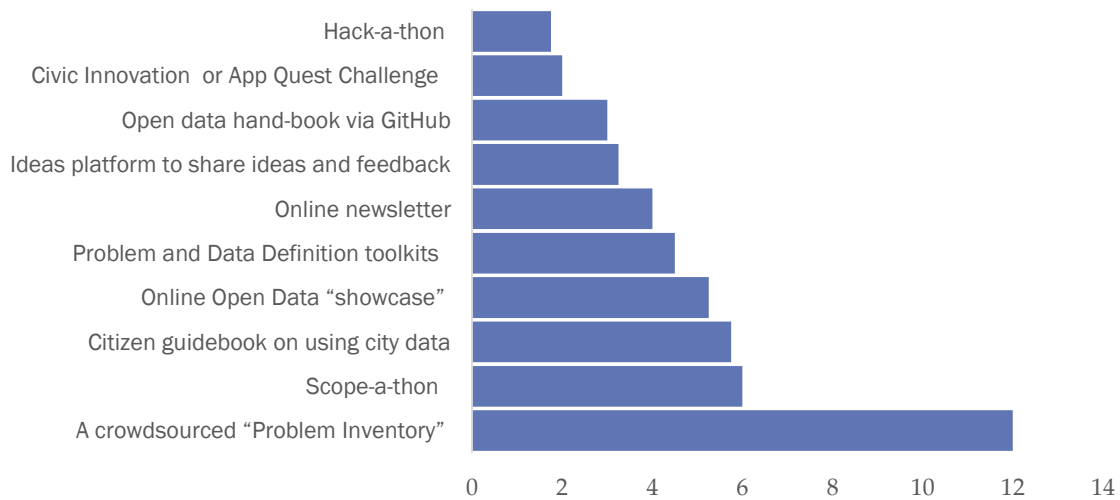
NEXT STEP: Create a crowdsourced "Problem Inventory" for city staff and residents to add questions and answers related to civic innovations.

Finding #8 Successful open data communications is consistent, two-way and reliable, taking place online and offline, informally and formally.

Communication between groups collaborating on open data projects should occur early and often. According to a report by Smart Chicago Collaborative, communications technologies need not be brand new or unused to have civic impact[29]. Useful communications tactics can integrate everyday digital tools such as email, blogs and twitter, and utilize them in new or different ways. For instance, cities can leverage existing digital tools, such as press releases, to showcase successful open data projects or include relevant open data links.

Listening and responding to what modes of communications are most used allows cities to better adapt their public engagement strategies to the needs of external partners, including civic technology groups. The following table offers some suggestions to optimize new and existing communications tools for different stakeholder audiences.

Table 3. Communications Tools

Communications Tool	Next Step	Internal Leads	Audience	Area of focus
Open Data Portal	• Create a metadata usage field that allows subject matter experts to identify best use cases.	City Staff and Open Data Program Manager	Open Data Users	Problem-Scoping
Online Forum	• Create a "problem inventory" that allows city staff and residents to scope out city needs, and share ideas and solutions	City Staff	Open Data Users, City Employees	Problem-Scoping, Collaboration
GitHub & Slack	• Create and market a hashtag for users to direct questions and feedback to Open Data staff	Open Data Program Manager	Civic Technologists	Collaboration
Social Media	• Create open data twitter feed to share relevant updates • Consider coordinating with other municipalities on open data social media efforts	Public Engagement Staff	City Residents, External Partners	Sharing updates, Announcing new datasets, Highlighting successes
Newsletter	• Develop a monthly or bimonthly newsletter for open data users • Highlight new datasets, successful open data projects	IT Department	City Staff, City residents, External partners	Sharing updates, Announcing new Datasets, Highlighting Successes
City Press Releases and PIO internal newsletters	• Integrate information about open data program into relevant city communications	Public Engagement Staff	City Residents and Employees	Sharing updates, Highlighting successes

Cities should strive to better understand and improve their use of communications tools already in existence, while recognizing that the communications preferences of external

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[29] Smart Chicago Collaborative http://www.smartchicagocollaborative.org/how-to-build-civic-engagement-in-civic-tech-2-use-existing-tech-structures/ March 2015

partners are subject to change over time. While primarily focusing on existing communications channels, cities should strive to periodically test and iterate new communications practices in conjunction with partners. Additionally, engaging in peer-to-peer learning from open data programs in other cities can help inform the best practices used in open data collaborations across the country.

Moreover, cities should strive to understand and apply different engagement tools for different phases of collaboration. Table 3 offers a number of next steps and considerations for both new and existing modes of engagement. The use of each communication tool should be informed by users and periodically adjusted to meet their needs and preferences. Minor interventions such as improved metadata fields or open data-focused hashtags can be used to test out interventions with existing modes of communications. Regardless of whether engagement takes place online or offline, any successful communications practice should strive to "meet community members where they are."[30]

NEXT STEP: Get periodic feedback on current and preferred forms of communications with external stakeholders.

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[30] Laurenellen "Experiential Modes of Civic Engagement in Civic Tech"http://www.smartchicagocollaborative.org/wp-content/uploads/2015/10/experimental-modes.pdf September 2015

Finding #9: Adoption challenges are rarely assessed or communicated early on.

Once a civic innovation is developed, city governments often face challenges in adopting or implementing civic technology. Adoption challenges can be technological, legal or operational in nature. In practice, adoption challenges are often only discussed after a project is completed. If the goal of an open data collaboration is for the city to ultimately adopt and implement a solution, then questions of confidentiality, privacy and security need to be considered from day one. Several participants underscored the importance of considering adoption needs at the very onset of any collaboration.

Because civic technologists and others may be less familiar with the operational and technical constraints city governments face (such as server limitations), city employees should clearly articulate and demonstrate path to adoption for open data projects. By identifying and communicating adoption challenges to external partners early on, cities can help set up a pathways of success for external partners to follow.

Questions for city staff and civic technologists to consider:
1. What is the timeline of this open data project? When does it need to be completed?
2. If the project is an application, who will host it after it is completed?
3. What programming code and software will be used?
4. Who will be responsible for maintaining the project after its development?

NEXT STEP: Create informational guide for city staff and external partners outlining adoption needs and constraints.

Finding #10: Holistic evaluations examine both in-person and digital engagement, focusing on activities, quality and impact.

Tracking progress and measuring success are critical components of an open data evaluation strategy. However, given the emerging nature of open data field, most open data evaluation has taken place anecdotally or informally. [31]   Moreover, easier to use evaluation criteria (such as the number of open data clicks, shares, or downloads) may overemphasize "clicktivsm" and detract from a holistic evaluation of impact and quality toward one-sided metrics.[32]

> "Not everything that counts can be counted, and not everything that can be counted counts."
>
> - Albert Einstein

According to a report by the Knight Foundation, quantitative data produced from common survey tools and web analytics should be incorporated alongside qualitative data to measure impact and better understand results.[33] Cities should be open to using different metrics, utilizing measures of both off-line and online engagement, while acknowledging the limitations.

In particular, the City of San Francisco suggests a move toward measuring indirect, but outcome-oriented indicators related to:

> "**Activity metrics:** How much did we do? **Quality metrics:** How well did we do it
> **Impact metrics:** Is anyone better off as a result? "[34]

To select accurate and useful indicators, open data evaluations must clearly define the goals and objectives of the open data program. For instance, a program goal may be to "increase civic engagement" as opposed to "build place-based social capital."[35] Though related, these goals likely require different metrics and resources. Cities should strive to clearly articulate their program goals, the purpose of the evaluation, and their intended audience. From there, cities should consider focusing on measuring activity, impact and quality, rather than "clicktivism" metrics. Additionally, cities should strive to allow communities to "co-design and contribute to impact assessments."[36]

NEXT STEP: Develop relevant sample metrics informed by program goals and previous open data collaborations.

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[31] DataSF "Open Data Evaluation Framework" https://docs.google.com/document/d/1pEKAkSVPgr2-HMUoYcQe-jFD3wViEk_DzalCQp4bxUA/edit
[32] Ibid.
[33]Knight Foundation "Digital Citizenship: Measuring Success" http://www.knightfoundation.org/digitalcitizenship/measuring/
DataSF "How to Measure OpenData" https://datasf.org/blog/how-to-measure-open-data/
[35] Knight Foundation "Assessing Civic Tech: Case Studies and Resources for Tracking Outcomes"
http://www.knightfoundation.org/media/uploads/publication_pdfs/NI_Knight_CivicTechAssessment_Mar2015.pdf
[36] William Bruce Cameron Digital Citizenship: Exploring the Field of Tech for Engagement Creative Commons License (cc) 2012 by Knight Foundation. www.knightfoundation.org

IV.   Recommendations

The following recommendations are informed by the findings previously discussed. Taken together, these recommendations suggest a path forward for governments to amplify civic innovation and leverage the power of open data and citizen engagement. These recommendations were selected on the basis of operational and political feasibility, as well as alignment with the goals of the City's Open Data ordinance.

1. Define the Problem

Challenge: Effective open data projects benefit from having well-defined problems. Because civic technology groups face diversity limitations and may lack in-depth knowledge about the issues that they are trying to solve, they may find it challenging to identify the City's true needs and assess the value of a potential open data project. Working with impacted communities, subject matter experts are best suited to formulate and clarify civic problems.

Future considerations for open data collaborations include:

- What are the key challenges or issues in your city? What role can civic technology play in mitigating or addressing these challenges?
- What information about the challenge or problem do you know? What is missing?
- Is the problem well defined and specific?
- Which city residents are affected by this problem? In what way?
- Is there demand for this solution or intervention?

Recommendation #1: In tandem with residents and community groups, subject matter experts in cities should take the lead in framing essential questions and crafting specific, well-defined problem statements and use cases for open data.

2. Build Capacity

Challenge: Cities employees often have varying levels of technological literacy and operational capacity. To invest in open data projects and collaborate with external partners, city staff needs to see the intrinsic value of open data and understand the operational processes, framework and constraints of open data users.

Future considerations for open data collaborations include:

- How many hours per week can a city employee devote to an open data project?
- What constitutes an open data success?
- What does a city employees need to know before initiating an open data collaboration?

Recommendation #2: Cities should prominently highlight open data successes, establish open data champions, and support training that improves data literacy.

3. Communicate

Challenge: Consistent, reliable, two-way communication with open data users groups is a necessary factor for the success of open data engagement. However, different community groups value and use different engagement tools and forms of communication. As a result, existing communications practices may fail to be meet the needs of different stakeholders.

Future considerations for open data collaborations include:

- What are the current communications tools used by different stakeholders?
- What are the barriers to using both existing and new communications tools? What are the strengths and weaknesses of each approach?
- Does this communications approach facilitate shared decision-making and collective problem solving?
- Is the communications approach mutually agreed upon, two-way and consistent?

Recommendation #2: **Cities should better leverage existing communications tools (e.g. press releases) while periodically testing and iterating new communications practices (e.g. online forums).**

NB: See Table 3. for specific suggestions on leveraging existing and new communications tools.

4. Implement

Challenge: Open data projects should be designed with usability and sustainability goals in mind. In practice, adoption challenges are often overlooked in the early stages and difficult to overcome in later stages. As a result, governments may be unable to adopt or promote civic innovations, and open data projects may take much longer to complete or remain incomplete.

Future considerations for open data collaborations include:

- What is the timeline of this open data project? When does it need to be completed by?
- If the project is an application, who will host it after it is completed?
- What programming code and software will be used?
- Who will be responsible for maintaining the project after its development?
- How will the city remain engaged with stakeholders after project completion?

Recommendation #4: **Communicate adoption constraints and expectations to external partners early on, while designing for usability and sustainability**

3. Evaluate

Challenge: Most open data evaluation has taken place anecdotally or informally. Moreover, evaluation criteria (such as the number of open data clicks, shares, or downloads) often fail to paint the full picture of open data and may divert the focus away from quality and towards specific metrics.

Future considerations for open data collaborations include:

- Are assessment measures for both offline and online engagement?
- Does evaluation criteria assess timelines, audiences, needs and unintended consequences?
- Do assessment measures examine equity and inclusivity issues?

Recommendation #5: **Consider a diverse range of criteria for both in-person and digital engagement, focusing on activity, quality and impact.**

V. Concluding Thoughts

Through effective public engagement strategies, open data has the potential to help add value and spur new civic innovation. Just as the success of open data depends on more than technology, the success of civic innovation depends on more than one community of stakeholders and one communication tool or form of engagement. Open data can make a difference both in internally in streamlining city operations and externally in developing civic technology that increases public participation and government transparency. Overall, cities should strive to create opportunities for sustained public engagement, both offline and online, informally and formally.

Further exploration and research in this arena will support the long-term success and sustainability of open data projects. By engaging external partners and identifying and sharing best practices across cities, open data practitioners can help amplify the potential of civic innovations. From open data portals to social media interactions, a new model of collaboration that addresses the key challenges and constraints that cities, residents and partners face can help launch the success of open data.

GOAL	RECOMMENDATION
1 — Define the Problem	• Subject Matter Experts should take the lead in crafting specific, well-defined problems
2 — Build Capacity	• Highlight open data successes, identify open data champions, and support data literacy
3 — Communicate	• Leverage existing communications • Test and iterate new communications practices
4 — Implement	• Communicate adoption expectations to external partners early on
5 — Evaluate	• Consider a diverse range of criteria for both in-person and digital engagement.

VI. Appendices

A. Stakeholder Analysis

EXTERNAL STAKEHOLDERS			
Business	**Non-Profits, Service Providers & Neighborhood Associations**	**Civic Technologists**	**Researchers (Faculty, Students & Administration)**
Motivations to use Open Data			
Realize economic value of Open Data	Serve community members and solve targeted problems	Use tech skills in service of community. Improve tech skills. Build project portfolio.	Analyze data to create publishable research
Constraints in using Open Data			
Influenced by needs and constraints of profit motive	Limited technological and operational capacity. Narrow focus.	Limited knowledge of city problems and operations.	Influenced by needs and constraints of academic institutions
Contributions to Open Data			
Create opportunities to add economic value	Assist in problem-scoping, identify major needs and increase inclusiveness of open data	Assist in developing civic innovations	Create relevant analysis of open data

INTERNAL STAKEHOLDERS			
Subject Matter Experts	**Public Engagement & Communications Staff**	**Open Data and IT Staff**	**City Management**
Motivations to use Open Data			
Solve city problems within their subject matter expertise	Highlight successful open data projects	Help spur civic innovation using open data	Improved transparency, accountability and service provision
Constraints in using Open Data			
Varying levels of technological and operational capacity.	Decentralized across the city. Limited technological capacity.	Limited ability to identify city problems, Limited operational capacity	Competing priorities
Contributions to Open Data			
Lead problem-scoping efforts, identify major needs and external partners	Integrate open data into communications infrastructure. Share information related to open data	Improve data access and quality. Engage stakeholders. Evangelize civic innovation.	Serve as open data champion. Highlight civic innovations

B.   Logic Model: Stakeholder Engagement & Open Data Collaborations

Activities

- Conduct Stakeholder assessment
- Understand and mitigate diversity and equity challenges
- Identify and build relationships with partners
- Identify and define civic problem/needs
- Communicate and coordinate with stakeholders
- Maintain and improve partnership processes
- Implement and manage open data program and policies
- Collect and share data
- Develop and disseminate knowledge

Outputs

- Multi-directional communication among partners
- Commitment from diverse set of partners
- Community provides timely, relevant input
- Increased communication channels
- Partnership development
- Tools to support community engagement
- Priority setting and implementation
- Information products

Outcomes

Short-term

- Open Data Project implementation
- Improved problem – scoping
- Increased equity and diversity in civic technology
- Greater community awareness and engagement in open data
- Increased accessibility and enhanced usage of City's Open Data
- Gov increasingly able to leverage internal and external sources of innovation

Long-Term

- New knowledge and solutions from open data collaborations; New or improved systems, tools, products and industries
- Improved efficiency in internal data sharing
- Increased economic development
- Improved gov operations and service delivery
- Greater capacity for public contributions to gov
- Creates opportunity for industry to create innovations
- More informed public and greater engagement in policy planning and implementation

C. Research Resources

MIT Resources

Human Mobility and Network Lab
http://humnet.scripts.mit.edu/wordpress
Overview: Research lab in the emerging field of urban computing, with a focus on the intersections of people with the built environment and their social networks. Professor Marta Gonzalez's team designs urban mobility solutions and to enable the sustainable development of smart cities.
Contact: Marta Gonzalez, Professor of Civil Engineering. Her current research explores human mobility patterns using mobile phone communication, propagation of mobile phone viruses and urban transportation models.

Email: martag@mit.edu

Civic Data Design Lab
http://www.civicdatadesignlab.org/about/
Overview: The Civic Data Design Lab employs data visualization and mapping techniques to expose and communicate urban patterns and policy issues to broader audiences. The lab seeks to develop alternative practices which can make work with data and images richer, smarter, more relevant, and more responsive to the needs and interests of citizens traditionally on the margins of policy development. The lab experiments with and develops data visualization and collection tools that allow researchers and practitioners to highlight urban phenomena.
Contact: Sarah Williams, Professor in the department of Urban Studies and Planning focuses on Urban Information, Technology, Media and Analytics.
Email: sew@mit.edu

MIT Media Lab (Macro Connections Group)
http://macro.media.mit.edu/
Overview: The Macro Connections group focuses on the development of analytical tools that can help improve our understanding of the world's macro structures in all of their complexity. By developing methods to analyze and represent networks—such as the networks connecting countries to the products they export, or historical characters to their peers—Macro Connections research aims to help improve our understanding of the world by putting together the pieces that our scientific disciplines have helped to pull apart.
Contact: Cesar Rodalgo, Assistant professor at the MIT Media Lab whose work focuses on improving the understanding of systems by using and developing concepts of complexity, evolution, and network science.
Email: hidalgo@mit.edu

MIT Computer Society and Artificial Intelligence Lab
Overview: The Computer Science and Artificial Intelligence Laboratory – known as CSAIL – is the largest research laboratory at MIT and one of the world's most important centers of information technology research. Includes several research labs on specific areas of focus.
Contact: https://www.csail.mit.edu/research/groups

MIT CoLab
Overview: CoLab supports the development and use of knowledge from excluded communities to deepen civic engagement, improve community practice, inform policy, mobilize community assets, and generate shared wealth. We believe that community knowledge can drive powerful innovation and can help make markets an arena for supporting social justice.
Contact: colab-info@mit.edu

Harvard Resources:

Harvard Computer Society
Website: https://www.hcs.harvard.edu
Overview: Dedicated to promoting interest in computing and information technologies among members of the Harvard community
Contact: Harnek Gulati, President:
https://www.hcs.harvard.edu/contact

Developers for Development
Overview: A community of students dedicated to applying our technical skills in the social impact space. Our mission is to engage & facilitate Harvard college students in this type of work while providing valuable technology to our partnering NGOs.
Contact: harvardd4d@gmail.com

Harvard Women in Computer Science
Overview: A group of students dedicated to building a community of technical women at Harvard and beyond
Contact: harvardwomenincs@gmail.com

CS50
https://cs50.harvard.edu/
Overview: An applied introductory course to the intellectual enterprises of computer science and the art of programming.
Timeline: Fall
Contact: David malan malan@harvard.edu

Other Resources

Boston Indicator Project
www.**bostonindicators**.org
Overview: The Boston Indicators Project offers new ways to understand Boston and its neighborhoods in a regional, national and global context. It aims to democratize access to information, foster informed public discourse, track progress on shared civic goals, and report on change in 10 sectors: Civic Vitality, Cultural Life and the Arts, the Economy, Education, the Environment, Health, Housing, Public Safety, Technology, and Transportation.
Contact: Anise Vance
Email: anise.vance@tbf.org

Boston Area Research Initiative
www.bostonarea**research**initiative.net
Overview The Boston Area Research Initiative (BARI) is an interuniversity research partnership housed at the Radcliffe Institute for Advanced Study at Harvard University. BARI—which emerged from an October 2011 symposium on "Reimagining the City-University Connection"—seeks to spur original research in the greater Boston area that is on the cutting edge of social science and policy. Central to this mission is an overarching effort to forge active and mutually beneficial relationships between the region's researchers, policymakers, practitioners and civic leaders. Funding for BARI's activities is provided by the John D. and Catherine T. MacArthur Foundation, the National Science Foundation, and the Radcliffe Institute. Key institutional collaborators are the City of Boston and the Rappaport Institute for Greater Boston.
BARI@radcliffe.harvard.edu
Contact: Dan O'Brien, Research Director, Boston Area Research Initiative
Email: daniel_obrien@radcliffe.harvard.edu

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